REMARKS

The Office Action mailed October 15, 2002, has been reviewed and the comments of the Patent and Trademark Office have been considered. Claim 14 has been cancelled without prejudice or disclaimer. Claims 13 and 19 have been amended. New claim 21 has been added. Claims 1-13 and 15-21 are pending in this application. Of these claims, claims 13, 15-19 and 21 are pending for consideration on the merits, with the other claims being withdrawn at this time.

Allowable subject matter

Applicants appreciate the indication that claim 15 would be allowable if rewritten in independent form. Applicants have not amended claim 15 at this time, however, because applicants believe that claim 13, from which claim 15 depends, is allowable for the reasons given below.

Rejections under 35 U.S.C. §§ 102 and 103

Claims 13-14, 16-17 and 19 stand rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent No. 6,060,686 to Jones (hereafter "Jones"). Claim 18 stands rejected under 35 U.S.C. 103(a) as being unpatentable over Jones in view of U.S. Patent No. 3,632,955 to Cruickshank (hereafter "Cruickshank"). Applicants respectfully traverse these rejections, insofar as they pertain to the claims as presently amended, for the following reasons.

Claim 13

Independent claim 13 has been amended to include the limitations of claim 14, which has been cancelled. Claim 13, as amended, includes the limitation wherein the nozzle is formed as a disk. Shaping the nozzle as a disk provides some advantages. When the nozzle is shaped as a disk, the area of the nozzle facing the workpiece can be increased, and thus the amount of gas trapped between the nozzle and workpiece can be increased. By

increasing the amount of gas trapped between the nozzle and workpiece, a shortage of gas available for welding is prevented, and the stability of the welding process is improved. Thus, by forming the nozzle as a disk, the shortage of gas available for welding can be prevented, and the stability of the welding process can be improved.

Jones fails to disclose a nozzle shaped as a disk, or its attendant advantages. The nozzle 20 of Jones appears to be a conventional cylindrical nozzle, not a nozzle shaped as a disk. In contrast to the nozzle as recited in claim 12, the cylindrical nozzle of Jones cannot trap an increased amount of gas between the nozzle and the workpiece 12. Jones is silent concerning increasing the amount of trapped gas. Thus, Jones fails to disclose the structure of the nozzle used in the method of claim 13, or its attendant advantages.

Cruickshank was cited for allegedly teaching separating visible light by a dichroic mirror and inputting the separated visible light into an image sensor. Cruickshank, however, like Jones, does not disclose a nozzle for supplying gas. Thus, even if Jones and Cruickshank were combined, the combination would not meet the limitations of claim 13.

Claim 19

Independent claim 19 has been amended to be in independent form. Independent claim 19 has also been amended to clarify that the nozzle is part of the optical head, and to include the limitation of adjusting a gap between the nozzle and the workpiece using a gap adjuster positioned between the optical head and the workpiece. Support for this amendment can be found at least in Figures 2A, 7A and 8A, and paragraph 32 of the specification. Jones fails to suggest using a gap adjuster positioned between the optical head and the workpiece. Jones discloses that to maintain a suitable standoff gap G and to allow suitable traversing of nozzle 20 during operation, the nozzle, as illustrated in FIG. 1 is affixed to a carriage 24 suitably supported, for example, atop workpiece 12 (col. 4, lines 5-8). Jones discloses that this carriage 12 may be a multi-axis machine tool (col. 4, lines 8-

12). The carriage 12 of Jones, however, is not positioned between the optical head and the workpiece. Thus, Jones discloses adjusting the gap in a very different fashion from claim 19.

As mentioned above with respect to claim 13, Cruickshank was cited for allegedly teaching separating visible light by a dichroic mirror and inputting the separated visible light into an image sensor. Cruickshank, however, like Jones, does not disclose a nozzle for supplying gas. Thus, even if Jones and Cruickshank were combined, the combination would not meet the limitations of claim 19.

For at least the reasons given above, applicants respectfully request that the rejections under 35 U.S.C. 102 and 103 be withdrawn.

New claim 21

New claim 21 has been added. New claim 21 depends from claim 19 and recites that the gap adjuster includes a sliding member. Support for new claim 21 can be found at least in paragraph 32 of the specification. New claim 21 is patentable for at least the same reasons as claim 19, from which it depends.

CONCLUSION

In view of the foregoing amendments and remarks, applicants respectfully submit that all of the pending claims are now in condition for allowance. An early notice to this effect is earnestly solicited. If there are any questions regarding the application, the Examiner is invited to contact the undersigned at the number below.

Respectfully submitted,

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By Thomas G. Bilodeau

FOLEY & LARDNER
Customer Number: 22428
22428
PATENT TRADEMARK OFFICE
Telephone: (202) 672-5300
Facsimile: (202) 672-5399

Thomas G. Bilodeau
Attorney for Applicant
Registration No. 43,438

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Versions with Markings to Show Changes Made

In the Claims:

Please amend claims 13 and 19 as follows:

13. (Once Amended) An underwater laser processing method, comprising:

irradiating a condensed laser beam generated by a laser source to a certain point of an underwater workpiece; and

supplying gas to the certain point from a nozzle having a gas exit, the nozzle having an area surrounding the gas exit that extends to the surface of the workpiece for keeping the supplied gas between the nozzle and the workpiece, wherein the nozzle is formed as a disk having the gas exit at the center thereof.

19. (Once Amended) [The method according to claim 13, further comprising] An underwater laser processing method, comprising:

irradiating a condensed laser beam generated by a laser source of an optical head to a certain point of an underwater workpiece;

supplying gas to the certain point from a nozzle of the optical head having a gas exit, the nozzle having an area surrounding the gas exit that extends to the surface of the workpiece for keeping the supplied gas between the nozzle and the workpiece; and

adjusting a gap between the nozzle and the workpiece using a gap adjuster positioned between the optical head and the workpiece.